Book Reviews.

GEHIRNPATHOLOGIE. I. ALLGEMEINE EINLEITUNG. II. LOCALISATION. III. GEHIRNBLUTUNGEN. IV. VERSTOPFUNG DER HIRNARTERIEN. Von Dr. C. v. Monakow, A. O. Professor der Neurologie an der Universität in Zürich. Mit 211 Abbildungen. Nothnagel's Specielle Pathologie und Therapie. Bd. IX. Theil I. Wien, 1897 (A. Hölder). Pp. I—IX and 1—924.

This volume, from the pen of a man already famous for his researches in human neurology and the experimental pathology of the nervous system, Prof. C. von Monakow, of Zürich, merits more than passing attention. No matter upon what topic this investigator and teacher might choose to dwell, his subscription of an article would attract to it the attention of most neurologists, but dealing, as the book before us does, in large part directly with the field in which its author's own investigations and experiments have been most fruitful, its advent will, we feel sure, be everywhere greeted with enthusiasm.

The volume forms a part of the elaborate system which has for some time been appearing under the editorial supervision of Prof. Nothnagel, of Vienna. The system as a whole is an exceedingly strong collection of monographs, and really does much, along with a few others which could be mentioned, to redeem this method of medical publication from the disrepute into which it was fast being driven; for the superficial compilations, hurriedly thrown together, which, under the names of systems and handbooks, have been disseminating loose and indifferent medicine and worse rhetoric in this and other countries for some time past, bade fair to condemn it utterly.

Von Monakow's book, as its title indicates, is divided into four principal parts. Under the first heading, the General Introduction to Cerebral Pathology, he considers: *A*, the Anatomy of the Brain; *B*, the Physiology of the Brain; *C*, the General Pathology of the Central Nervous System, and *D*, the Clinical Manifestation of Organic Diseases of the Brain.

The sub-section dealing with the anatomy of the brain makes interesting reading. Although, from the nature of the book, of necessity brief, reference will be found to the principal well-established facts. After a short introduction, in which the phylogeny and ontogeny of the nervous system are considered, the author immediately passes on to a description of the morphological constituents, the principal centres and important bundles of fibres of the adult brain. The sulci and gyri of the pallium, the basal ganglia, the projection-fibres, commissures and association bundles all receive due attention. The account given of the diencephalon, mesencephalon and rhombencephalon is brief, but being entirely free from padding will be found sufficiently full for most of the needs of the clinician. The text is accompanied by simple but helpful anatomical illustrations.

The neurological histologist will perhaps complain of the small amount of space allotted to the "elements of the nervous system," and it must be admitted that, even bearing in mind only the needs of the practical man, this section might have been lengthened with advantage. One gains the impression, which is probably true, that von

Monakow has been more interested in experimental physiology and pathology, and the study of cases of secondary degeneration, than in the application of modern cytological methods to the investigation of the structure of the nerve cells.

The general architectonics of the nervous system are, on the other hand, very satisfactorily examined, and the author is to be congratulated upon his concise and clear presentation of the conception of the neurone-complexes—the grouping together of neurones to form special functional elementary mechanisms. This is preceded by a somewhat detailed account of the principal methods employed in the investigation of the finer cerebral architecture. The methods of serial sectioning, of comparative anatomy, of ontogeny, including the following of myelinization in serial sequence, the method of Golgi and its modifications, are in turn referred to. As might be expected, much stress is, and with right, laid upon the importance of the study of secondary degenerations in the tissues derived from human beings, who, during life, have suffered from lesions of the nervous system, which have been carefully studied at the bedside. It is by means of such studies and of similar ones upon tissues derived from experimental animals that von Monakow himself, following upon von Gudden, has been able to contribute so liberally to the general stock of neurological knowledge. The method of investigation based upon an examination of suitable instances of congenital malformations also receives its fair share of praise. It will be recalled that it was by this method that von Leonowa, working with von Monakow, proved that the spinal ganglia, with their ganglion-cells, and peripheral and central nerve fibres along with a complete muscular system, can become developed in the entire absence of the spinal cord.

The classification given by von Monakow of the gray matter, and of the white matter is new; the novelty consists, not in the distinction of the nuclei of origin of the motor and sensory nerves, and in the recognition of the nuclei terminales of the central axones of the spinal and cerebral peripheral sensory neurones, for these, since the embryological studies of His, have met with general acquiescence, but rather in the grouping of certain gray masses in the diencephalon, mesencephalon and rhombencephalon as cerebral appanages or dependencies (Grosshirnantheile). Under the designation Grosshirnantheile von Monakow includes all those structures which, though anatomically not always consisting of homogeneous masses of gray substance, still in their functions as well as in their whole economy (nutrition) are wholly or partially dependent upon the cerebral cortex. These gray masses are evidently phylogenetically young, for they are absent in lower forms and increase progressively in size and number in direct proportion to the development of the cerebrum. Here, in the first place, are classed by von Monakow the majority of the nuclei of the thalamus, and especially the corpora geniculata (lateral and medial) of the two sides. The substantia nigra, certain elements in the superior colliculi, pons and medulla also come in this category. This view, which, it may be recollected, has been more than once advanced on previous occasions by the same author in special articles, also assumes that the majority of white fibres extending between the cerebral dependencies and the cerebral cortex are corticopetal, not corticofugal in direction. Other neurologists have held this view with regard to the corpora geniculata, but the theory is not in harmony with prevalent conceptions regarding many of the thalamic nuclei. Should it prove to be true, as von Monakow apparently believes, that all of the thalamo-cortical axones are corticopetal in direction, and further, that the bundle of axones from each nucleus of the thalamus is distributed to a perfectly definite, circumscribed and ascertainable cortical area, then the hypotheses held by many neurologists with regard to the nature and functions of the thalamus and with regard in general to the relations existing between the diencephalon and telencephalon will have to be materially altered. At present, however, it seems scarcely safe to deny the existence of every and any corticofugal connection between the pallium and the thalamus.

While von Monakow's treatise is on the whole remarkable for its accuracy and carefulness of statement, still one or two points to which exception might be taken are observable. In the first place, the bundle of medullated axones formed by the descending limbs of bifurcation of the central axones of the peripheral sensory neurones which correspond to the sensory portion of the N. trigeminus is spoken of as a rule as the "aufsteigende Wurzel," although the author is careful to say that the fibres arise from the Gasserian ganglion and that they terminate in the medulla. Why the majority of German writers, and it must be confessed also a goodly number of English neurologists, persist in designating as *ascending root* a bundle which they certainly know consists of *descending* fibres is difficult to understand. Any one who has taught the anatomy of the nervous system to medical students knows that the difficulties of neurological instruction, especially with regard to the direction followed by the axones of the various fasciculi, are sufficiently great even when the nomenclature applied is entirely rational. It is but little wonder that students resent being told that the axones of an ascending root descend! Might it not be well to do away then with the false term, especially since it can be replaced by the entirely satisfactory "tractus spinalis nervi trigemini." ?

The description given by von Monakow of the vestibular nuclei in the rhombencephalon is, in the opinion of the reviewer, open to serious criticism. The *nuclei terminales* seem to be confused in the text (p. 82) with the *nuclei originis* of the nerve, a matter of little importance perhaps to a reader of much experience (for is not similar confusion omnipresent in neurological bibliography?), but most unfortunate for the less advanced student. Part of the vestibular nerve *arises*, von Monakow states, in the medulla; the nerve, he emphasizes, has *nothing* to do with Deiters' nucleus, but *arises* in the main from Bechterew's nucleus! He admits that a *part* of the vestibular nerve has its origin in Scarpa's ganglion. The report in this connection will, we feel sure, be materially altered in a second edition.

Objection might with justice be made to the description on p. 114, in which the so-called N. opticus is assumed to be homologous with the peripheral sensory nerves; and to that on p. 128, in which the path underlying the impulses concerned in visual perceptions is designated as "zweigliederig," but these are minor criticisms and too much stress is not to be laid upon them.

In sub-section *B*, the physiology of the brain is dealt with. After emphasizing the extraordinary importance of animal experiment for the investigation of the cerebral functions, a portion of the work which, by the way, might be read with advantage by those who are still in doubt as to the utility and justifiableness of vivisection, the author treats of the differences of function in the various gross subdivisions of the brain in different groups of animals. For though telencephalon, diencephalon, mesencephalon, metencephalon and myelencephalon are in a large series of animals to be regarded as derivatives of similar portions of the primitive medullary tube, yet they are by no means always exactly homologous. On the contrary they differ markedly in the individual representatives of the vertebrate series, not only quantitatively but also qualitatively in degree of development, and in the significance of each of the parts for the neural economy. In this connection von Monakow calls attention especially to the experimental results of Steiner and Schräder on lower forms, and of von Gudden, Goltz, Horsley and Schaefer, Munk and others on higher forms. He concludes that the difference in behavior of animals after cerebral defect corresponds completely to the morphological differences in the foundations and memberment of the individual cerebral centres. The lower an animal stands phylogenetically, the less does the intelligence, sensation and locomotion of the animal suffer from removal of the cerebrum. If cerebral removal does give rise to symptoms of this sort, they concern in the lower forms first the intelligence and the spontaneous taking of food, and only later in higher forms (with gradually increasing intensity) are the individual senses injured, especially that of sight; serious disturbance of gross locomotion does not result from cerebral defect until the highest phylogenetic stages have been reached. Von Monakow, therefore, views with favor the theory advanced by Steiner when he defines a brain to be a general movement centre, in connection with the activities of a nerve of special sense. Wherever these conditions meet, there a brain exists. The higher the animal, the farther forward the centres of control (Wanderung der Function nach dem Vorderende). Von Monakow extends the conception of Steiner by utilization of anatomical and physiological studies, classifying the centres as "phylogenetically old" and "phylogenetically young." By the former he means the fundamental neural structure, already indicated in Amocœtes, which contains all the mechanisms necessary for primitive or "mechanical" life; this structure is characterized by the tolerably great functional independence of its parts (mid-brain, hind-brain, after-brain). By the latter he means the "supplementary" structure, represented by the cerebral cortex and the regions of the cerebrum dependent upon this and developed in direct proportion to it, namely, his Grosshirnantheile. This supplementary structure, which attains to its highest development in man, is further characterized by the principle of the strict subordination of the so-called Grosshirnantheile to the cerebrum, and the principle of the co-operation of several portions of the brain anatomically widely separated from one another.

For each of the organs of special sense there would appear to be two anatomically separated nuclei of reception in the cerebrum, one phylogenetically old, the other phylogenetically young. It is especially through the latter that the connection for the cerebral cortex is made. In man, for the reception of sensory pictures and for the majority of complex reflex acts which are acquired through the intervention of consciousness, it is the phylogenetically young structure which is active. In lower forms the young and old centres are very incompletely differentiable anatomically, while in the lowest vertebrates the phylogenetically young centres appear to be entirely absent. Thus in connection with the optic neurones, the mesencephalic terminations of the N. opticus would correspond to the phylogenetically old center, while the diencephalic terminations (in the corpus geniculatum laterale and the pulvinar of the thalamus) would correspond to the phylogenetically young centre. In fish the whole N. opticus terminates in the roof of the mesencephalon; the diencephalic termination is met with first in birds (Edinger); in man the mesencephalic termination by means of the brachium quadrigeminum superius is relatively insignificant, while the terminations in the corpus geniculatum laterale and pulvinar and the connections by way of these through the radiatio occipitothalamica Gratioleti with the cortex of the lobus occipitalis are developed ad maximum.

By all means the best portion of the sub-section under consideration, however, is the extensive review of the results of physiological experiment upon the cerebral cortex. As might have been expected, the discussion here is masterously handled, and the reader is led in an orderly manner through the various researches dealing with electrical excitation, and extirpation of points and areas of the cortex. The cortical areas of the so-called motor zone, those for cutaneous and muscular sense, those for vision and those for hearing are successively considered, and the sub-section closes with some remarks upon the restitution of cortical functions after cerebral defect, together with brief reference to the doctrines of "association centres" in the brain as formulated by Flechsig.

The general pathology of the central nervous system is next taken up. The author's classification of cerebral diseases is given on p. 227. He divides them into four groups: 1. General or partial dynamic disturbances (including the "functional diseases"). 2. Diffuse and localized diseases of the brain and its membranes of circulatory and inflammatory nature. 3. System-diseases, and, 4. Focal diseases of the brain and its membranes. Only those of the fourth category are considered in the volume before us (and of those practically only the diseases dependent upon arterial alterations), the other diseases of the cerebrum being dealt with by various writers in other portions of Nothnagel's System.

The paragraphs upon pathological alterations in the ganglion-cells, like those dealing with the normal histological appearances of these structures, will scarcely prove satisfactory to those whose interest and research are directed chiefly toward such problems. Still, the principal points are mentioned, and it is worthy of note that the author includes certain important conditions not infrequently met with which are too often overlooked by investigators who are entirely under the spell of methylene blue and soap.

One turns naturally with much expectation of thoroughness to the chapter on secondary degeneration, and in so doing does not meet with disappointment. This portion of the book is admirable. The origin, course and significance of the degenerative process are fully described. Not only is the secondary degeneration in the sense of Waller properly valued, but the cellulipetal degeneration following injury to an axone, and the alterations in the cell-body of the neurone due to such causes are clearly described. The secondary alterations resulting from the application of the method of von Gudden receive especial attention. The finer histological changes are illustrated by drawings.

The atrophy of the II. Order, or so-called tertiary atrophy, for example such as affects the diencephalo-telencephalic neurones extending from the corpus geniculatum laterale to the lobus occipitalis after enucleation of an eye, or that which, after defect of the lobus parietalis, concerns the neurones, the cell-bodies of which are situated in the nuclei funiculi gracilis et cuneati, is clearly distinguished from ordinary secondary degeneration; the process is here so sharply characterized that there can no longer be any excuse for the confusion which has unfortunately marred many contributions to the literature of this subject in the past. Von Monakow, at the conclusion of the pages dealing with the degenerations, cites some of the more important examples of secondary degeneration in the brain of man and the higher animals after extensive cerebral lesion, especially those which are of value from a clinical standpoint or of particular interest for general pathology.

To the clinician the portion of the book, amounting to something more than 100 pages, dealing with the clinical characters of organic diseases of the brain will prove unusually attractive. The author divides these into: *(a)* Phenomena of a general nature (including headache, vertigo, respiratory disturbances, alterations in the temperature and circulation, vomiting, and finally disturbances of a psychic nature); and *(b)* Focal phenomena (motor, ataxic, sensory and trophic). His profound anatomical and physiological knowledge here stands him in good stead, and the clinical symptoms of cerebral disease are, as far as present knowledge will permit, supplied with rational explanations.

The second principal part of the book treats of Cerebral Localization, a topic which, considering its complexity, the immense bibliography pertaining to it, and the uncertainty which still exists with regard to many fundamental points, is most satisfactorily handled. Everywhere one sees the hall-mark of a rich personal experience, and one cannot help wishing, after reading such an article, that medical publications in general could in some way be limited to those emanating from men who have some actual first-hand knowledge of the things of which they write.

The motor region, the parietal lobe, the visual area, the frontal gyri, are in turn dealt with, and the effects of gross and minute lesions described in detail. Of enormous value are the individual cases cited in which, following upon a thoroughly conducted clinical study during life, there has been a modern autopsy with not simply macroscopic examination of the central nervous organs, but also a thorough study of serial sections with the microscope. The time has gone past when the old-time slicing up of a brain at a post mortem examination can advance our knowledge of cerebral pathology. It is necessary now, in order to make progress, to determine exactly not only the actual nature and limits of cortical or ganglionic involvement in a given case, but also to establish definitely the extent of the disease in the white matter, and to decide how much of this is due to the direct encroachment of the primary pathological process and how much of it represents disease of a secondary nature. Von Monakow's laboratory, in Zürich, has been especially active in the sectioning of pathological human brains and has set an example to the world of what far-reaching results may be obtained from accurate studies of this kind. One brain fully described in this way is worth a hundred incomplete reports. Since the author, in this subdivision of his work, has not only carefully weighed his own results, but has instituted a comparison with those of others, the frequent consultation of these pages by both clinicians and pathologists may be predicted with confidence. It would require more space than that at our disposal to attempt an analysis of the various lesions dealt with here. Perhaps the most interesting section, though it seems invidious to select, is that dealing with disturbances in the central visual apparatus, under which heading hemianopsia, hemichromatopsia, cortical and mind-blindness, alexia and optic aphasia are discussed. The hypothesis of the Zürich neurologist with regard to the explanation of the behavior of the macula in hemianopsia is pleasing, but the anatomical proof has still to be brought.

The chapters dealing with the localization of disturbances of speech of cortical origin are worthy of being reprinted in the form of a separate monograph. It is in these that the scientific openness of mind of the author is perhaps most in evidence. The deliberate presentation of objective, clinical and pathological facts to the exclusion as far as possible of the schemata and hypotheses which abound in works on aphasia is matter for gratitude. True, to the beginning medical student, one or another of the various schemes of aphasia is doubtless helpful, but to the man who attempts to gain a deeper knowledge of the subject, the method of inquiry which moulds its conceptions on realities is of far greater value. And after all, may not "students of the better sort" have some books written for them? There is reason to be thankful that there are certain books, like this of von Monakow's, that are something more than milk for babes! The clinical types of aphasia ordinarily met with are first described at some length, and afterwards the pathological anatomy of the disturbances of speech, and the finer localization within the speech region of the cortex are undertaken. This method of handling the material necessarily leads to considerable repetition, but with a subject which is even yet obscure, notwithstanding the strenuous efforts which have been made to illuminate it, rehearsals of known facts, especially when viewed from different visual angles, are not only permissible but desirable. If the reader were to carry away with him no more than a vivid impression of the possible variability of the clinical picture in aphasia and a consciousness of the inadequacy of all attempts thus far made to afford a satisfactory anatomical explanation for the various clinical types, the perusal of these pages would be well worth the while.

The section on localization includes also a discussion of lesions in the capsula interna, the basal ganglia, the cerebral peduncle, the corpora quadrigemina, the pons and the cerebrum, and closes with an exhaustive analysis of internal and external ophthalmoplegia.

The last two sections of the work deal with cerebral hemorrhages and with embolism and thrombosis of the cerebral arteries. The anatomy of the cerebral circulation is fully described, the descriptions being accompanied by excellent illustrations, many of which are in colors. The pathology and symptomatology of these affections are thoroughly gone into, not only in general, but with especial reference to lesions involving single arteries and their branches. Nor, as sometimes happens with writers well versed in pathology and diagnosis, have the sections on prognosis and therapy been neglected. The practical man, who wishes to know exactly what to do, not only in cerebral emergencies, but also in the often more puzzling after-care of a case, will find here explicit instructions for his guidance. A judiciously selected list of titles of original articles adds to the value of the various sub-divisions of the work.

The publishers have done their part well. The introduction of colors into the figures in the text makes decidedly for clearness. An occasional misprint meets the eye, for example "heriditären" on p. 220, and "Nouronencomplexen" on p. 225, but considering the size of the work and the rapidity with which it must have been written and put through the press, misprints are remarkably few in number.

On the whole, von Monakow's book represents a most valuable contribution to cerebral pathology, and can be warmly recommended to all who are interested in the healthy or diseased human brain.

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LEITFADEN DER PHYSIOLOGISCHEN PSYCHOLOGIE. In 15 Vorlesungen, von Prof. Dr. Th. Ziehen in Jena, mit 23 Abbildungen im Text. Vierte theilweise umgearbeitete Auflage. Gustav Fischer, Jena, 1898.

For the alienist this present volume is one of the most useful introductions to the study of psychological phenomena that we have